FIG. 1.   Organization of a perceptron.

Rosenblatt's perceptrons

Simple and general models

Outline

➢ Simple perceptron

➢ General perceptrons

Papers

- A probabilistic model

1. How is information about the physical world sensed, or detected, by the biological system?

2. In what form is information stored, or remembered?

3. How does information contained in storage, or in memory, influence recognition and behavior?

Biological plausible

❧ Properties of the perceptron originally proposed by Rossenblatt

❧ Four layers: retina(optical stimuli), projection layer, association layer, responses

❧ Excitatory and inhibitory connections, Feedforward transmission from input to association layer

❧ Feedback connections from responses to association.

❧ On-off activations of units in the input layer, projection layer, association layer
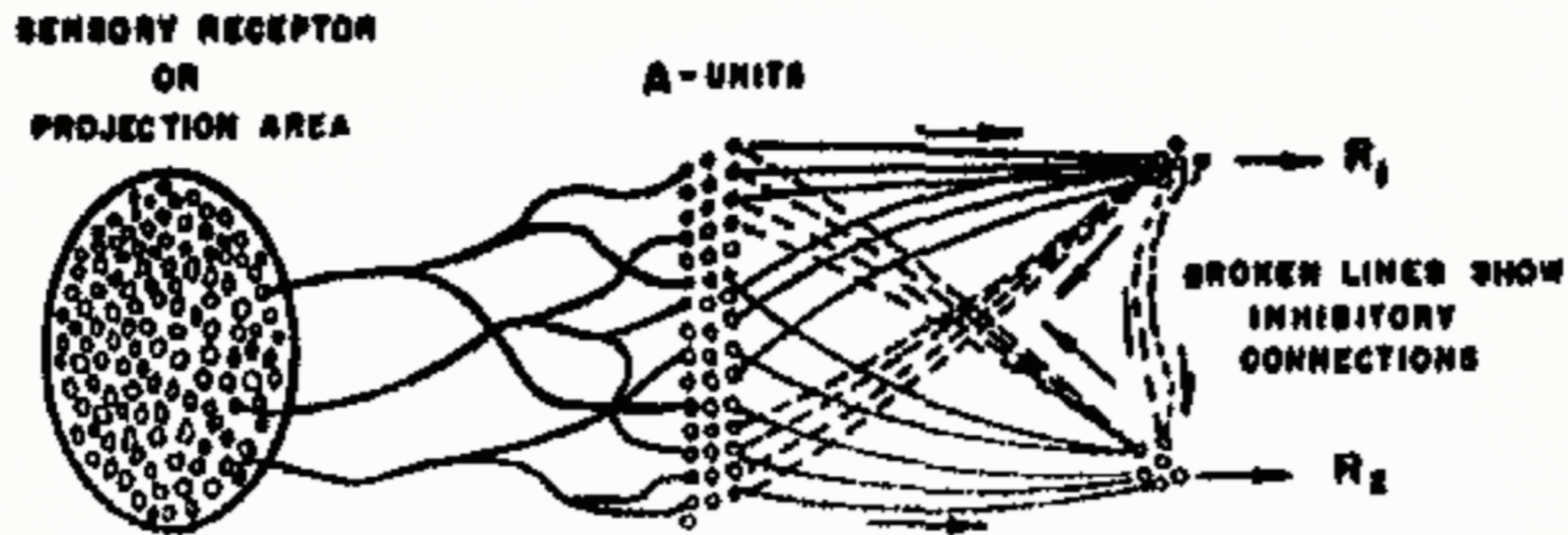
❧ Connection distribution

SENSORY RECEPTOR
OR
PROJECTION AREA

A - UNITS

BROKEN LINES SHOW
INHIBITORY
CONNECTIONS

R_1

R_2

FIG. 2A. Schematic representation of connections in a simple perceptron.

R_1 SOURCE-SET

A_1

A_2

R_1

R_2

S

R_2 SOURCE-SET

⊙—○ INHIBITORY CONNECTION
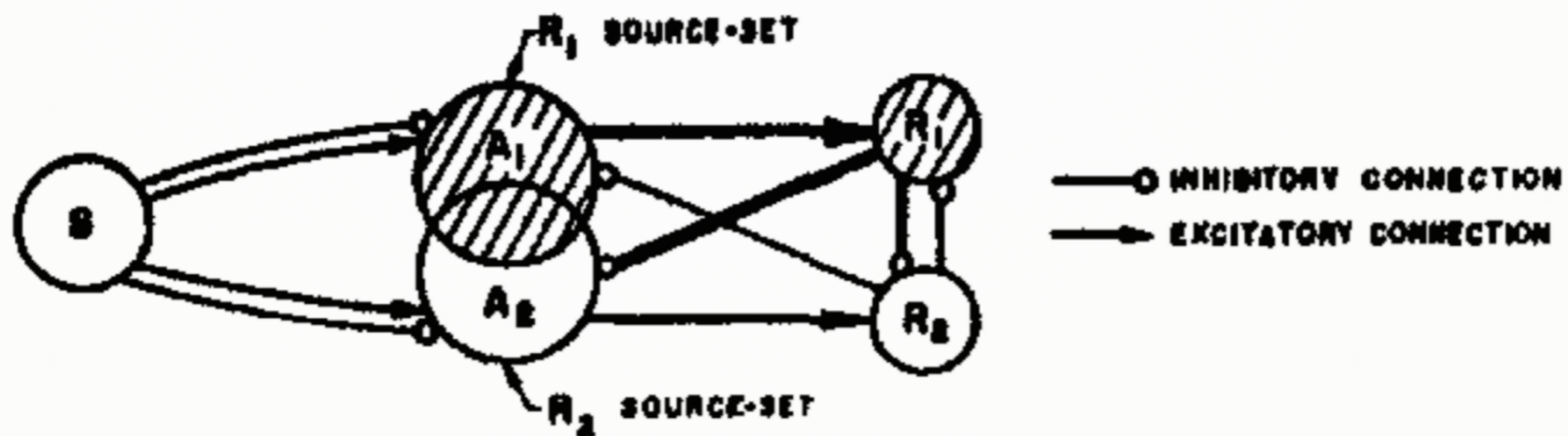
⊙—▶ EXCITATORY CONNECTION

FIG. 2B. Venn diagram of the same perceptron (shading shows active sets for R_1 response).
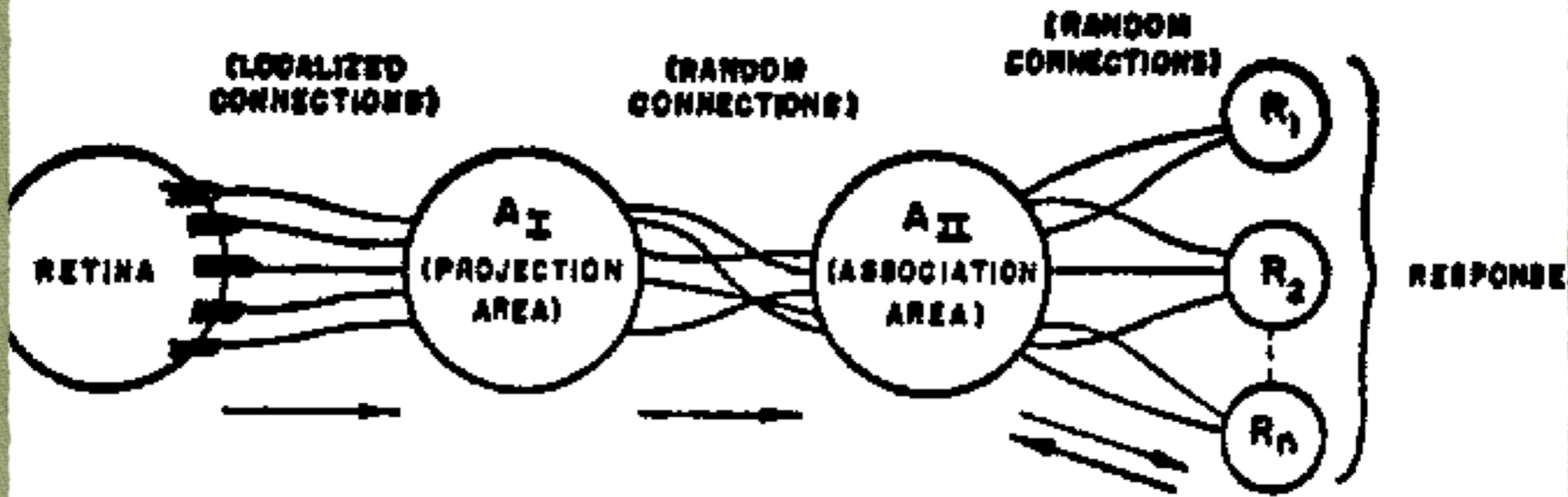
FIG. 1. Organization of a perceptron.

Winner take all principle

- Binary states

- Two alternative states

- Multiple states

- Winner take all

- Mutually exclusive activations

Matrix projection

❧ Vector projection

❧ Vector-type receptive fields

❧ Matrix-type synapses

MIMO

❧ Multiple external fields $\{h_i\}$

❧ Multiple responses $\{s_i\}$

❧ Coupling binary units

❧ Excitatory potentials

❧ Logistic responses

❧ Coupling mechanism for multi ally exclusive activations

Coupling circuits